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ENTOMOLOGY.

THE PREPARATORY STAGES OF *CALOCAMPA CINERITIA* (Grote).—One hundred or more eggs were found at Warwick, R. I., clustered together upon a twig of white birch, May 10th, 1885. Diameter of egg 1^{mm} . Shaped like a depressed cone, ribbed vertically and dark gray in color. They hatched in the same day that they were found.

Larva upon emergence.—Length 3^{mm} ; color, light bluish-green, sprinkled with black. Two pairs of pro-legs only. Head ochreous yellow, large and prominent; two transverse rows of blade tubercles in each segment, each giving rise to a single, simple black hair or bristles. Head likewise provided with black warts and bristles.

After first molt.—Passed the first molt after six days, after which the length of the body was 7^{mm} ; uniformly cylindrical and slender. Two front pairs of pro-legs rudimentary. Head less prominent, and green, concolorous with the rest of the body, which is slightly darker than before. Black tubercles disappeared. A single transverse row of minute black bristles in each segment, hardly visible except by the aid of the microscope. These longitudinal dorsal and two lateral lines of very light green. Ventral half of the body of a lighter shade than the dorsal.

After second molt.—Five days later, they began to pass the second molt, after which they measured when extended upon a leaf 12^{mm} in length. Markings same as after the first molt, but more pronounced, dorsal portion of a darker green, and the stripes creamy-white.

After third molt.—After ten days, they passed the third molt. Length 29^{mm} ; color, uniform yellowish-green. A pronounced white stripe running the whole length of the body on each side, and above this a much narrower subdorsal stripe on each side of the single dorsal line. Five stripes in all. Dorsal portion of the body sprinkled with white specks. All the pro-legs fully developed.

After fourth molt.—Ten days later, it passed the fourth molt. Length 30^{mm} . Body straight and cylindrical. Head and first segment large and prominent, thicker than the rest of the body. Head rather flat. Color of body below reddish ochreous, head of a lighter shade. A narrow longitudinal white stripe running the entire length of the body, between these stripes a rich yellowish-brown. A dark brown velvety stripe running down the center of the back, with a V-shaped mark of the same color on each segment, with the opening towards the head.

After ten days more without any indication of passing another molt, the larvæ underwent a very decided change. They lost entirely their velvety look, and assumed the greasy appearance of cut-worms, curling themselves up when disturbed, seeking retire-

ment when not feeding, and in all ways taking up the habits of this group of noctuid larvæ.

Being transferred to a cage provided with earth, they at once buried themselves, but came out at night to feed. They continued this life for perhaps a fortnight, when they gradually left off feeding. Just when pupation occurred it was impossible to tell, as the larvæ remained in the ground some time in a torpid state before this change took place, and at this time many of them died.

The pupæ, which had been reserved for description, were unfortunately destroyed by mice. They were of a dark shining brown color, rather thick and blunt at the anal extremity, and somewhat flattened at the thorax. The molts emerged from the 20th to the 30th of September, some two months or more after pupation probably took place.—Howard L. Clark, *Providence, R. I.*

MORPHOLOGY OF LEPIDOPTERA.—In the *Zeitschrift für Wissen. Zoologie* for Oct. 27, N. Cholodkovsky states that it has been found that three species of the Linnæan genus *Tinea* possess only two Malpighian vessels, a most unexpected phenomenon, and until the present time an isolated fact in insect anatomy, unless we except certain Coccidæ, which have been found by Leydig and Mark to also possess but two Malpighian tubes. On the other hand, Cholodkovsky has found in *Galleria mellonella* Linn. a very peculiar form of Malpighian vessel, which up to now has been described in no other insects, and which only finds its parallel among the Arachnida. This example is an illustration, he says, of the utter incompleteness of our present knowledge of insect anatomy.

In several female *Nematois metallicus* Pod. Cholodkovsky found that each ovary consisted of not less than twelve, and in one case twenty egg-tubes. The number of egg-tubes in Lepidoptera generally is four. There is only a single known exception to this rule. Dr. Alexander Brandt in 1876 discovered that *Psyche helix* possessed on each side six egg-tubes, while Professor Ed. Brandt stated verbally that *Sesia scoliiformis* possesses fourteen egg-tubes.

Cholodkovsky then describes the external and internal genitalia of *Nematois*, and, in describing the ovipositor, refers to the much more highly organized ovipositor of the common house-moth (*Tineola biselliella*).

All Lepidoptera possess two compound testes, which in the greater number are united by a complicated set of coverings into an unpaired organ. Since each testis consists of four seminal follicles they are in every respect homologous with the egg-tubes of the females. There is anatomically a complete and clear homology between the female and male sexual glands of the Lepidoptera. This fact is not without significance in the morphology of Lepidoptera, especially since it becomes a link connecting the Phry-

ganidæ with the Lepidoptera, though only from forms allied to the Phryganidæ is the phylogenetic derivation of the Lepidoptera conceivable.

He also finds a small chitinous ring at the end of the abdomen of the male, which he regards as the rudiment of a tenth abdominal segment.

Cholodkovsky regards these cases of the occurrence of primitive characters in Lepidoptera as instances of a periodical atavism, or retrogression to the most primitive form of anatomical structure. In conclusion, the author with good reason finds fault with the term "Microlepidoptera," thinking it artificial and absurd to classify animals by their size alone.

FLIGHTS OF LOCUSTS AT SAN LUIS POTOSI, MEXICO, 1885.—We have received the following description of a flight of locusts at San Luis Potosi, Mexico, in a letter dated June 9, 1885, from Dr. G. Barrœta, well known as one of the most cultivated scientists in Mexico:

"On the 31st May a cloud of grasshoppers came from the N. E. and S. E. to this city, and remained about three hours, leaving only on account of rockets, the ringing of bells and every kind of noise. Never before in this century have locusts invaded this land. By this mail I send a tin box with samples. Those in white paper reached a year ago certain places of the state, 150 miles east of this city, and at the altitude of 3000 feet above the sea. They were collected in Rioverde, and then the cloud took its way to the southeast. In the aforesaid box, those in blue paper belong to the invading swarm which visited the city on May 31st. I found no difference between them, and suppose them to be the progeny of the swarms noticed in 1884, or, at least, the same species."

Unfortunately the specimens were never received, so that we are unable to give the name of the species.—*A. S. Packard.*

LONGEVITY OF ANTS.—Not the least interesting fact which has resulted from my observations has been the unexpected longevity of these interesting insects. The general opinion used to be that they lived for a single season, like wasps. Aristotle long ago stated that queen-bees live for six and some even seven years. Bevan, however, observes that "the notions of both ancients and moderns upon the subject have been purely conjectural. Indeed, it appears to be somewhat doubtful whether the length of life which the former seem to have attributed to individual bees was not meant to apply to the existence of each bee-community."

The nests, however, which I have devised have enabled me to throw considerable light on this question. The queen ants are so easily distinguished from the workers that they can be at once identified, while, if a nest be taken in which there is no queen, we can satisfy ourselves as to the workers; because, though it is true

that workers do sometimes lay eggs, those eggs invariably produce male ants. Hence, in such a case, the duration of the nest gives us the age of the workers; at least they cannot be younger, though, of course, they may be older. In this way I have kept workers of *Lasius niger* and *Formica fusca* for more than seven years. But, what is more remarkable still, I have now two queens of the latter species which I have kept ever since 1874, and which, as they were then full-grown, must be now nearly twelve years old. They laid fertile eggs again this year, a fact the interest of which physiologists will recognize. Although a little stiff in the joints, and less active than they once were, they are still strong and well, and I hope I may still keep them in health for some time to come.—*Sir John Lubbock in Contemporary Review for Nov.*

ENTOMOLOGICAL NEWS.—In the Proceedings of the Entomological Society of Belgium, Dec. 5., the venerable Senator M. de Selys-Longchamps gives the outlines of a revision of the Agrionines.—The *Zeitschrift für Wissen. Zoölogie*, October 27, contains an elaborate article on the anatomy of the Mallophaga, by F. Grosse; it gives excellent figures of the mouth parts.—Mr. L. Bruner publishes in the Bulletin of the Washburn College laboratory of natural history a “first contribution to a knowledge of the Orthoptera of Kansas,” with descriptions of a number of new species.—In the same publication, Mr. F. W. Cragin notices certain Myriopods and Arachnids of Kansas.—In the Memoirs of the National Academy of Sciences, Mr. S. H. Scudder describes and figures a Tertiary Orthopod; it has no distinct head. It is referred to the Thysanurans, and regarded as the type of a suborder called Ballostoma. We would add, that the thysanurous characters do not seem to be well marked, while it is possible that the specimens, though numerous, had lost their heads.—In Dr. Agassiz’ report as curator of the Museum of Comparative Zoölogy, it is stated that the museum has received from the Peabody Academy of Science at Salem the most important collection of insects ever added to the museum. It contains a large number of types described by prominent American and European entomologists. The collection, we may add, was brought together mainly by Professor A. S. Packard. It contains a large proportion of Packard’s types, including those of his monograph of geometrid moths, of which only four species are wanting, and nine described by him from specimens belonging to other entomologists. It also comprises types of Mr. Grote and the late V. T. Chambers, as well as types of Zeller, Staudinger, Foerster, Walker, etc.